

Climatological Data for September, 1910. DISTRICT No. 12, COLUMBIA VALLEY.

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GENERAL SUMMARY.

Although the precipitation for September, 1910, averaged 0.42 inch below normal, the preceding droughty condition was partially relieved by moderate rains in nearly every locality of District No. 12. The rainfall was not heavy enough to seriously interfere with harvest work, but in most places it was sufficient to soften the ground for fall plowing, which made good progress. All forest fires were extinguished by the middle of the month and the weather was favorable for every branch of industry, except transportation on the rivers, which was seriously hampered by unusually low water.

TEMPERATURES.

The mean temperature, as determined from the records of 229 stations, was 57.3°, which is 0.5° below the district average. The mean temperatures ranged between 68.0° at Zindel, in extreme southeastern Washington, and 46.1° at Ovando, in west-central Montana. The warmest sections were in the lowlands of the interior, particularly the immediate valleys of the Columbia and the Snake rivers, where mean temperatures of 60° to 65° occurred. The coolest sections were the elevated portions in the interior, mean temperatures of 46° to 50° occurring at some stations in western Montana and in central Idaho, above the 3,500-foot level.

The highest temperatures occurred generally during the 2d decade, and the lowest were usually recorded from the 24th to the 26th, at which time frost formed over eastern sections, but no damage to unharvested fruit or staple vegetation was reported. The highest recorded temperature was 98° at Glens Ferry, Idaho, elevation 2,569 feet, on the 19th, and at Zindel, Wash., elevation 715 feet, on the 14th. The lowest temperature was 12° at Chesterfield, Idaho, elevation 5,424 feet, on the 26th.

PRECIPITATION.

The average precipitation, as determined from the records of 340 stations, was 1.16 inch, which is 0.42 inch below the normal for the district. The heaviest rainfall occurred along the Washington and northern Oregon coasts, and in western Montana, but the only departures above normal precipitation were in southwestern, south-central, and eastern Washington, and in the western counties of Montana, Idaho, and Wyoming.

Over the northern portion of the district the rainfall was quite well distributed throughout the month, but in Oregon and southern Idaho the greater portion of the precipitation occurred from the 13th to the 21st.

The greatest monthly precipitation was 5.52 inches at Quinalt, Wash., in the coast drainage area, and the least was 0.02 inch at Blalock, Oreg., in the Columbia River Valley, and also at Gold Beach, Oreg., in the Rogue River Valley. The greatest 24-hour rainfall was 2.76 inches on the 29th at Quinalt, Wash., and the second greatest was 2.10 inches on the 17th at Bay City, Oreg., in the coast drainage area.

THE RIVERS.

The Columbia River and its feeders were unusually low during the greater part of the month, and in many cases the mean stages were the lowest ever recorded for September. The mean stages at all stations were uniformly lower than those of the preceding month.

The Columbia River averaged 3.0 feet below the normal for the month, being 1.6 foot below at Vancouver, 3.5 feet below at The Dalles, and 2.8 feet below at Wenatchee. At Cascade Locks, with a record of 14 years, the present September mean stage of 2.3 feet is the lowest mean ever recorded. The low stage of the river enabled the dredges to make rapid progress in

their work of deepening the channel and also aided in the location of sand bars and other obstructions that are most in need of attention.

The Willamette River fell steadily throughout the month with the exception of the last few days, when a slight rise was reported from most of the stations. The mean stage was below normal at all stations, and ranged between 0.2 foot below at Wilsonville and 0.9 foot below at Portland. The unusually low stage of the upper Willamette has seriously interfered with navigation for the last three months.

The Snake River averaged 0.8 foot below the September normal, and was 0.8 foot lower than the mean stage for August; the mean stage at Lewiston, Idaho, being 0.2 foot above the zero of the gage.

MISCELLANEOUS.

The prevailing winds were from the west. The highest wind recorded occurred at North Head, Wash., where a velocity of 52 miles per hour from the south occurred on the 29th. The average hourly velocity for the month at that station was 11.6 miles. The percentage of possible sunshine was 64 at Spokane, 42 at Seattle, and 39 at Portland. Hail was recorded at several stations in western Montana on the 16th and 24th. Thunderstorms were unusually numerous in the portion of the district lying east of the Cascade Mountains, occurring principally on the 16th, 17th, 19th, and 20th, some of the storms being very severe. Killing frosts occurred in many places as early as the 7th.

THE FORT HALL IRRIGATION PROJECT, IDAHO.

By JOHN J. GRANVILLE, Superintendent of Irrigation, U. S. Indian Service.

The lands to be irrigated under this project lie at an elevation of 4,500 feet in Bingham and Bannock counties between ranges 33 and 35 east, and townships 3 and 6 south, of Boise Meridian. The soil, with the exception of some 14,000 acres of sand lying in the north third of the area to be irrigated, and extending in an easterly and westerly direction entirely through the tract, is a volcanic ash covered with a heavy growth of sage brush, and capable, when supplied with water, of raising excellent crops of all kinds, except the tenderest vegetables and fruits.

The area to be irrigated contains approximately 50,000 acres exclusive of the sand belt, the water for which will be supplied principally by the construction of a dam and the creation of a reservoir on the Blackfoot River, in ranges 41 and 42 east, townships 5 and 6 south, and in part from the Snake River.

The dam site and reservoir area present great natural advantages.

The Blackfoot River, for a distance of about 16 miles, flows through a marsh, some 5 miles in width at its broadest point, before reaching the site at which the dam is being constructed, and has an average fall of about 8 inches per mile. At the site of the dam the river enters a narrow basalt gorge with nearly vertical walls on both sides, those on the south side rising to a height of about 70 feet and on the north to about 40 feet. The width of the canyon at this point is 120 feet at the water line and 250 feet at the crest of the dam, which is 40 feet above the water. The construction of this dam, with the bottom of the spillway 8 feet below the crest, or 32 feet above the water surface, will impound approximately 200,000 acre-feet.

Bed rock was found extending entirely across the canyon at a depth of about 4 feet below the bed of the stream or 6 feet below the water surface.

The dam itself is the loose-rock and hydraulic-filled type, and an ample supply of rock was found for the construction of the

spillway and take-off tunnel, for the rock-filled portion, and a surface covering at the north end of the dam, 10 to 15 feet in depth, was used for the hydraulic fill.

The drainage area above the dam is 666 square miles and from the meager data at hand it has been estimated that the average annual run-off will be 163,000 acre-feet. In addition to the drainage from the Blackfoot Basin, the flood water rights from John Grays Lake (which lies but a few miles northeasterly from the Blackfoot reservoir), having an estimated flood discharge of 50,000 acre-feet, have been secured.

The reservoir lies at an elevation of 6,200 feet above sea level, surrounded on all sides by rather high hills and mountains, having generally long easy slopes.

The Blackfoot River, following a tortuous course between the mountains, comes from a southeasterly direction from near the State line to where it enters the reservoir, and it is from this source that most of the water will be derived.

On the lower slopes of the mountains and hills there is a scant growth of timber, but toward the top of the peaks considerable quaking aspen and pine may be found.

The winters are long and cold and the snowfall is heavy. Along the valleys and on the open stretches the snow often attains a depth of 4 feet on the level, while on the mountains and in the gulches, especially in the vicinity of the Caribou Mountains, the snow attains to great depths.

PAYETTE-BOISE PROJECT, IDAHO.

By F. W. HANNA, Project Engineer, U. S. Reclamation Service.

HISTORY.

Preliminary investigations were begun by the Reclamation Service on the Payette-Boise Project in 1903, and in the month of December of that year steps were taken by some of the leading citizens of the Payette and Boise valleys toward a preliminary organization of the landowners. On March 4, 1904, a committee of this organization addressed a communication to the Secretary of the Interior setting forth the general irrigation conditions in the valleys, agreeing to form a permanent organization of the landholders upon the approval of the project. This communication was printed as Senate Document 247 and was referred to the Director of the United States Geological Survey, who recommended to the Secretary of the Interior that surveys and examinations of the project be continued. Following this recommendation a permanent organization of the landholders of the valley was formed on August 10, 1904, under the title of the Payette-Boise Water Users' Association. In pursuance of the recommendations of the Director of the Geological Survey to the Secretary of the Interior, general investigations of the project were continued and were brought to a conclusion during the field season of 1904.

On March 27, 1905, favorable recommendations having been made as to the feasibility of the project, the Secretary of the Interior approved the project and set aside \$1,300,000 for use in starting work. Immediately following the approval of the project negotiations were instituted for the transfer to the Reclamation Service of the New York Canal and for the purchase of the lands lying within the site of the Deer Flat reservoir, and general surveys relating to the south side unit of the project were pushed to completion by the close of 1905. On February 1, 1906, bids were opened for the construction of the Boise River diversion dam, the main south side canal to partial capacity leading from this dam to the Deer Flat reservoir and for the upper Deer Flat and lower Deer Flat embankments.

In March, 1908, excavation of the canals and laterals of the distribution system was begun under the cooperative plan with the Payette-Boise Water Users' Association, and the construction of the structures thereon was undertaken by force account, on which basis the work proceeded until September 10, 1909. Subsequent to this date, construction of the structures on the

distribution system has been carried on by force account as before and the excavation of the laterals has been done by the settlers by means of small contracts.

In the original undertaking of the project, lands lying north of the Boise River in the Boise and Payette valleys were comprehended in the limits of the project, but no work has been done on this portion of the project, except of a very preliminary investigative character. Recently, there has been formed what is known as the Black Rock Canyon Irrigation District, comprising the settlers of this portion of the project for the purpose of taking up the construction of an irrigation system for all the lands originally included in the north side portion of the Payette-Boise Project.

LOCATION AND CLIMATIC CONDITIONS.

The Payette-Boise Project is located in the southwestern part of Idaho, in the valleys of the Snake and Boise rivers, in Ada and Canyon counties. The average elevation of this irrigable area above sea level is 2,500 feet, the average rainfall is about 13 inches, and the range of extreme temperatures is from 100° to -28° F. The project is served by the Oregon Short Line, the Boise, Nampa and Owyhee, and the Idaho Northern railroads, and by the Boise Valley and the Boise and Interurban electric lines, the principal towns on the project being Boise, Nampa, and Caldwell.

IRRIGABLE LANDS.

The present Payette-Boise Project contains 243,000 acres of irrigable land, 164,000 of which are new lands and 79,000 of which are old lands, consisting of 18,000 acres under the old New York Canal, 25,000 under the Ridenbaugh Canal in the Nampa-Meridian Irrigation District, and 36,000 acres in the Pioneer Irrigation District. Of these lands 85,820 acres are entered subject to the reclamation act, 30,059 acres are State lands, and 127,130 acres are private lands. The soil consists, generally, of loam and sandy loam and is highly productive in character, being adapted to the economical production of alfalfa, clover, timothy, small grains, sugar beets, hardy varieties of apples, prunes, and small fruits.

IRRIGATION DISTRICTS AND NEW YORK CANAL COMPANY.

Reference has already been made to the "old lands" of the project and a word of explanation as to what is meant by this expression will be in place. Within the limits of the Payette-Boise Project and forming a part thereof are two irrigation districts and the New York Canal Company lands. These organizations consist of the Pioneer Irrigation District, controlling the Phyllis and Caldwell canals in position to cover 36,000 acres now irrigated; the Nampa-Meridian Irrigation District, controlling the Ridenbaugh Canal in position to cover 25,000 acres now irrigated and 30,000 acres of new land ultimately to be covered by it through feeding from the main south side canal; and the New York Canal Company lands, comprising 18,000 acres under irrigation lying under the main south side canal. All of these lands have adequate flood water rights, but are mainly signed up with the Payette-Boise Water Users' Association to receive stored water from the Payette-Boise Project.

WATER SUPPLY.

The water supply for the Payette-Boise Project is derived from the Boise River, comprising a watershed of approximately 2,610 square miles, with an average elevation above sea level of approximately 5,000 feet, on which the annual rainfall is about 25 inches. The maximum run-off of the Boise River is about 3,000,000 acre-feet, the mean about 2,000,000 acre-feet, and the minimum about 1,000,000 acre-feet per annum. The flood season in the Boise River generally covers the months of March, April, May, June, and a portion of July. During the latter part of July and the remainder of the irrigation season, the normal flow of the river has to be supplemented with stored water for the lands of the project. The duty of water for the project has